Claims

1. A ceramic brake lining which is reinforced with carbon fibers and has a matrix which consists essentially of silicon carbide together with silicon and/or carbon, wherein the reinforcing fibers used are long fibers having a mean length of at least 10 mm which are aligned in the plane parallel to the friction surface.

2. The brake lining as claimed in claim 1, wherein the thermal conductivity perpendicular to the friction surface is not more than 50 % of the thermal conductivity parallel to the friction surface.

3. The brake lining as claimed in claim 1, wherein the reinforcing fibers are present in the form of at least one layer of unidirectional or multidirectional layers, mats, woven fabrics or braided materials, which in the case of a plurality of layers are stacked one above the other.

4. The brake lining as claimed in claim 1, wherein the reinforcing fibers are present in the form of bundles each comprising at least 100 individual fibers.

5. The brake lining as claimed in claim 3, wherein at least five layers of reinforcing fibers are stacked one above the other.

6. The brake lining as claimed in claim 1, wherein the thermal conductivity parallel to the friction surface of the brake lining is at least 21 W/m·K.

7. The brake lining as claimed in claim 1, wherein the thermal conductivity perpendicular to the friction surface of the brake lining is not more than 19 W/m·K.

8. The brake lining as claimed in claim 1, wherein the mass fraction of silicon carbide in the brake lining is at least 10 %.

9. The brake lining as claimed in claim 1, wherein the mass fraction of silicon in the brake lining is at least 10 %.

10. A combination of a lining plate and the brake lining of claim 1, wherein the brake lining is joined to the lining plate by means of at least two screws.

11. A combination of a lining plate and the brake lining of claim 1, wherein the brake lining is joined to the lining plate by adhesive bonding.

12. A process for producing the brake lining as claimed in claim 1, which comprises the following steps:

a) production of a fiber arrangement of carbon fibers arranged essentially in a plane, wherein the fibers may be present in the form of individual fibers, fiber bundles or fiber yarns and the fibers and/or fiber bundles or fiber yarns being bound by a carbonizable binder,

b) shaping and/or curing of the bound fiber construction under pressure and/or at elevated temperature, if desired followed by further densification by means of carbonizable carbon precursors,

c) carbonization or graphitization of the bound cured fiber construction to produce a shaped body comprising carbon reinforced with carbon fibers (C/C),

d) at least one further densification of the C/C shaped body by means of pyrolytic carbon formed either by liquid-phase infiltration with carbonizable carbon precursors and subsequent carbonization or by gas-phase infiltration with carbon, and

e) infiltration of the densified C/C shaped body with a silicon melt and partial reaction of the silicon with at least part of the carbon in the shaped body to form silicon carbide, so as to give a composite ceramic comprising carbon fibers embedded in a matrix comprising SiC, Si and C (C/SiC).

13. The process as claimed in claim 12, wherein the silicon melt in step e) further comprises additional metals selected from the group consisting of titanium, iron, chromium, copper and molybdenum.

14. A method of use of the brake lining as claimed in claim 1 in combination with brake discs made of C/SiC, comprising arranging the brake linings in a caliper which extends around the flat surfaces of the brake disk.

15. The method of use of a brake lining as claimed in claim 14 in combination with brake discs made of CFC.

16. A method of use of a lining as claimed in claim 1 as friction lining in a friction clutch, comprising combining the said lining with a clutch disk.